WAVETEK

OPERATOR'S MANUAL

Model **UC10A**
Universal Counter

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Universal Counter

Wavetek Corporation
Instruments Division
9045 Balboa Ave
San Diego, CA 92123

European Distribution and Service Center
Wavetek Ltd
Hurricane Way, Norwich, NR6 6JB
England

ONE YEAR LIMITED WARRANTY

Model UC10A Universal Counters are warranted against defects in parts, material and workmanship within a period of one (1) year following the date of purchase of the Universal Counter by the original buyer. This warranty is extended by Wavetek Corporation only to the original buyer or original user of the instrument, who must present proof of purchase at the time of warranty service.

In the United States any instrument claimed to be defective during the warranty period should be returned with proof of purchase to Wavetek Corporation Instrument Repair Department. For warranty repair outside the United States, contact your local Wavetek Corporation dealer or distributor where your Universal Counter was purchased, or return it to Instrument Repair Department.

ANY IMPLIED WARRANTIES arising out of the sale of a UC10A universal counter, including, but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above stated one (1) year period. Manufacturer shall not be liable for loss of use of the universal counter or other incidental or consequential damages, expenses or economic loss.

Some states do not allow limitations on how long implied warranties last or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Wavetek Corporation
San Diego, CA

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Section One
INTRODUCTION

The Model UC10A Universal Counter is a general-purpose, feature-packed instrument. It is designed to deliver reliable, high-quality operation in a wide variety of applications: production test, education and training, laboratory, service and repair, as well as calibration.

The Model UC10A includes the following standard features:

1. Measures frequency to 100MHz, period, frequency ratio, time interval, and unit count
2. Eight-digit, 0.313-inch LED display
3. Built-in attenuator
4. Four gate time selections
5. Beeper indicating function or gate time selections
6. Self extinguishing plastic case, test leads, and power cord.

Section Two
UNPACKING

The box should contain the following items:

1. Model UC10A Universal Counter
2. Power cord
3. Coaxial test lead (2 each)
4. Operator's manual
5. Warranty card

Section Three
SAFETY PRECAUTIONS

Always strictly observe the following precautions when operating this instrument.

1. The maximum input voltage which can be applied to the input depends on the frequency of the input and the position of the attenuator switch. This relationship is shown graphically in Figure 2, and the values given in this figure must be strictly observed. To reduce the chance of damaging the input circuit, start with the attenuator in the X 0.1 position. If the counter doesn't count, then switch the attenuator to the X 1 position.
2. Use this instrument within an ambient temperature range of 0°C to 50°C. Do not place the counter on top of high-temperature equipment.
3. Never permit water to enter the interior of this instrument.
4. Never subject this instrument to severe shock.

Section Four
FEATURE DESCRIPTION

For features described in this section, refer to Figure 1. It is HIGHLY RECOMMENDED that the user become familiar with the controls, indicators, and connectors described below before operating the instrument.

1. FREQ RATIO & TIME INTERVAL Input
   Use this input only for Frequency Ratio and Time Interval measurements.

2. FREQ Input
   Use this input for Frequency, Period, Frequency Ratio, Time Interval, and Unit Count measurements.

3. ATTENUATOR Switch
   Pushing this switch in will provide a 10:1 attenuation on the "A" input only. This feature will attenuate high level signals.

4. "OVER" LED Indicator
   This LED will come on whenever the value of the display requires more than eight digits. When this overflow condition exists, the display could be meaningless. If the overflow condition happens in frequency, period, frequency ratio, or time interval measurements, it can possibly be rectified by selecting a smaller gate time, which in turn will decrease the number of decimal places so that a larger value of eight digits can be displayed.

5. "GATE" LED Indicator
   This LED will come on whenever the counter is counting or making a conversion. The length of time that the LED is on is proportional to the gate time selected. This feature allows one to know whether the electronic gate is operating or not.

6. "KHz" LED Indicator
   This LED comes on whenever a frequency measurement is displayed.

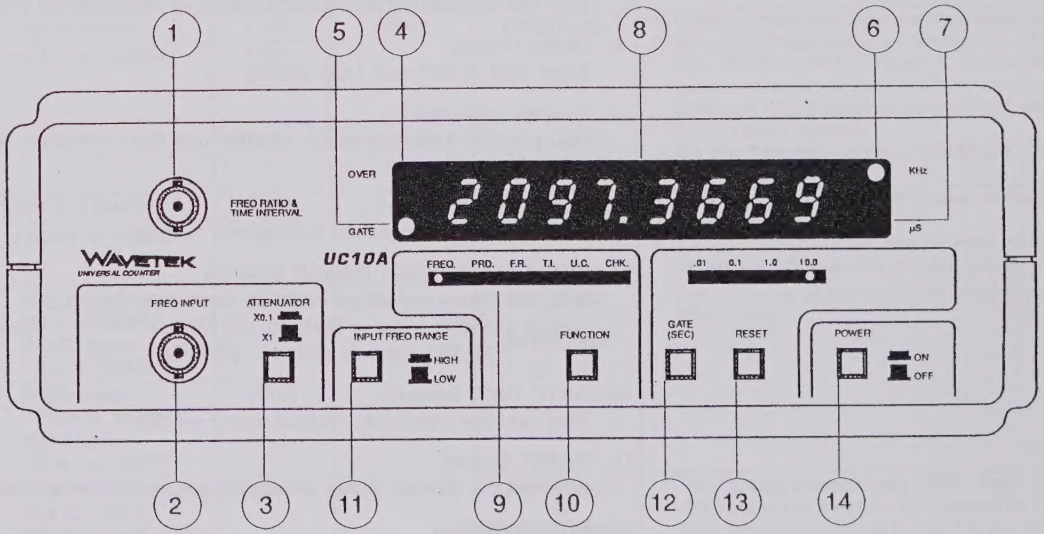


Figure 1. Model UC10A Universal Counter

7. "μS" LED Indicator
   This LED comes on whenever a period or time interval measurement is displayed.

8. Digital Display
   Eight digit, 0.313-inch LED display.

9. Function Indicators
   LED position indicates which function has been selected. A beeper will sound whenever the function selection is changed.

10. FUNCTION Switch
    Push this button to select the desired function.

11. INPUT FREQUENCY RANGE Selector
    Sets the frequency range limits for both inputs.
    Switch in: FREQ input is 50Hz to 100 MHz
    RATIO input is 50Hz to 25 MHz
    Switch out: FREQ input is 5Hz to 10 MHz
    RATIO input is 5Hz to 2.5 MHz

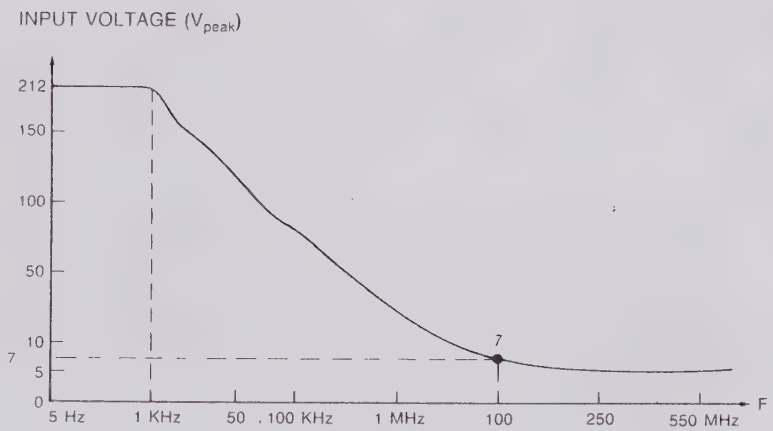
12. GATE TIME Selector
    This sets the electronic measurement window.

13. RESET Button
    It clears the display, lights all display segments and on release, activates a new measurement.

14. POWER Switch
    This switch turns the instrument on or off.

Section Five
BASIC MEASUREMENT INSTRUCTIONS

FUNCTION	INPUT MAGNITUDE	RANGE SETTING	GATE TIME SETTING	INPUT CONNECTION	REMARKS
Frequency	5Hz to 10MHz	LOW	Select	FREQ Input	1. Observe maximum input voltage limits (see Figure 2) 2. When low frequencies are measured, a low pass filter, as illustrated in Figure 3, can be inserted between the signal input and the counter input to attenuate high frequency components that may cause false triggering. 3. For low frequency measurements see remark #2 under "Period."
	10MHz to 100MHz	HIGH			
Period	5Hz to 2.5MHz	LOW	Select	FREQ Input	1. Period (in seconds) is the inverse of frequency (in Hz). 2. Period measurements may be used to determine low frequency more quickly and accurately.
	2.5MHz to 25MHz	HIGH			
Frequency Ratio	FREQ Input: 5Hz to 10MHz RATIO Input: 5Hz to 2.5MHz	LOW	Select	FREQ Input & RATIO Input	1. Put the lower of the two input frequencies on RATIO Input.
	FREQ Input: 50Hz to 100MHz RATIO Input: 50Hz to 25MHz	HIGH			
Time Interval	FREQ Input: 5Hz to 10MHz TIME INTERVAL Input: 5Hz to 2.5MHz	LOW	Select	FREQ Input & TIME INTERVAL Input	1. This feature operates with FREQ Input going low at the start of the event, to be followed by TIME INTERVAL Input going low at the end of the event.
Unit Count	5Hz to 10MHz	LOW	N/A	FREQ Input	
Check	None	N/A	N/A	None	



NOTE: These values must not be exceeded when the signal contains a DC component (V_{peak} = DC Voltage + Peak AC Voltage). When there is no DC component, V_{peak} = Peak AC Voltage.

Figure 2. Maximum Input Voltage versus Frequency

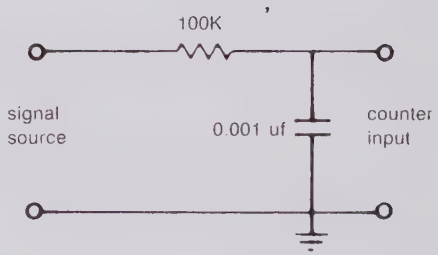


Figure 3. Low-Pass Filter

Section Six
SPECIFICATIONS

Specifications are subject to change without notice.

6.1 GENERAL SPECIFICATIONS

Display	8-digit, 0.313-inch high LED display
Functions	Frequency, period, frequency ratio, time interval, unit count, check
Indicators	14 LEDs: KHz, μS, OVER, GATE, 6 functions, 4 gate times
Operating Temperature	0°C to 50°C, 80% R.H.
Storage Temperature	−40°C to 70°C
Time Base Temperature Stability	±5ppm (25°C ±5°C) ±20ppm (0°C to 50°C)
Initial Time Base Calibration	±5ppm max. at 23°C
Aging Rate	1ppm per month max.
Weight	5.55 lb. (2.5kg) typical
Dimensions	22.8(W) x 8(H) x 32.9(D) in centimeters 9(W) x 3.125(H) x 13(D) in inches Exclusive of handle
Accessories	Test leads (2 each), AC power cord and fuse

6.2 ELECTRICAL SPECIFICATIONS

At 23°C ±5°C, 70% R.H. Max.

Frequency Input

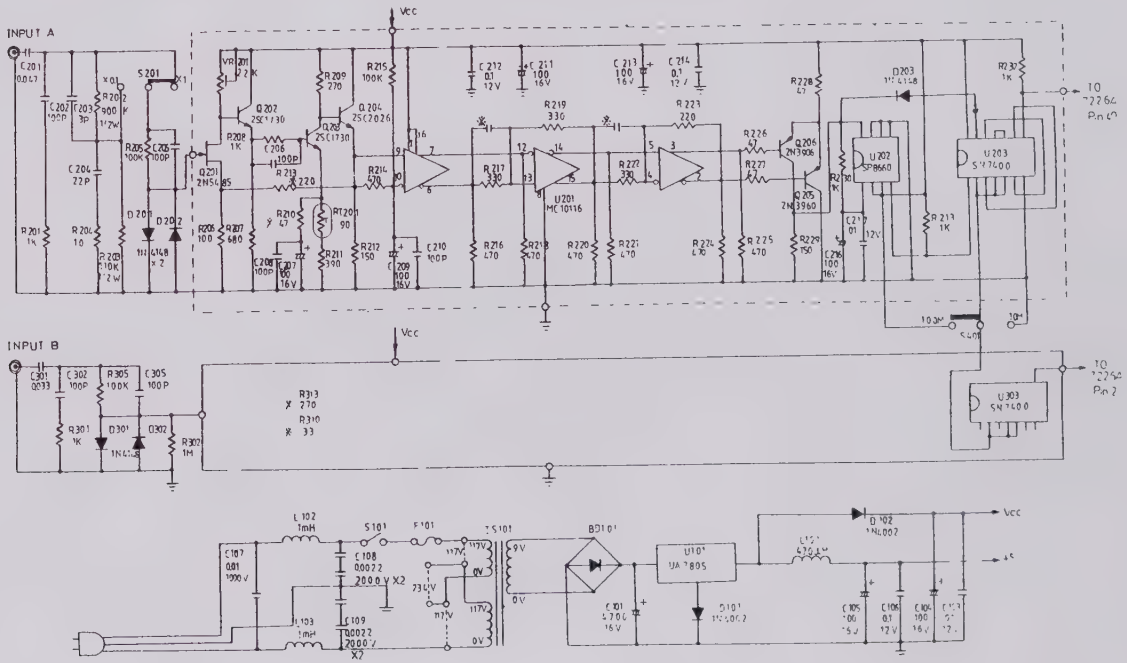
Low Range	FREQ Input: 5Hz to 10MHz	High Range FREQ Input: 50 Hz to 100 MHz
	RATIO Input: 5Hz to 2.5MHz	RATIO Input: 50 Hz to 25 MHz

Frequency Measurement	
Range	5 Hz to 100 MHz
Gate Time	Selectable 0.01 sec. 0.1 sec, 1.0 sec, 10 sec

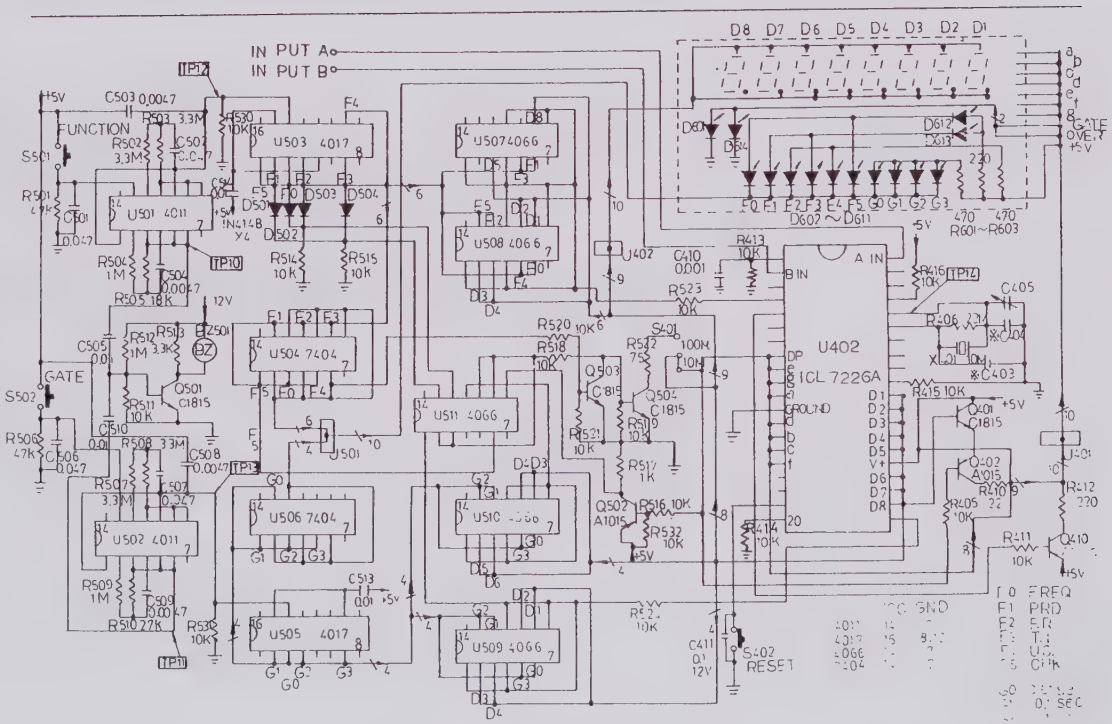
Frequency Measurement (Continued)	
Resolution	
5 Hz to 10 MHz	100 Hz, 10 Hz, 1 Hz, 0.1 Hz
50 Hz to 100 MHz	1000 Hz, 100 Hz, 10 Hz, 1 Hz
Accuracy	±(Time base stability + 1 count)
Period Measurement	
Range	0.04 μsec to 0.2 sec
Gate Time	Selectable 0.01 sec, 0.1 sec, 1.0 sec, 10 sec
Resolution	
5 Hz to 2.5 MHz	0.1 nsec, 1.0 nsec, 10 nsec, 100 nsec
2.5 MHz to 25 MHz	0.01 nsec, 0.1 nsec, 1.0 nsec, 10 nsec
Accuracy	±1 count ±time base stability ±trigger error of signal
Frequency Ratio	
Input Frequency	
Low Range	FREQ Input: 5 Hz to 10 MHz RATIO Input: 5 Hz to 2.5 MHz
High Range	FREQ Input: 50 Hz to 100 MHz RATIO Input: 50 Hz to 25 MHz
Accuracy	±1 count of FREQ Input + trigger error of RATIO Input
Time Interval	
Input Frequency (Low Range only)	5 Hz to 2.5 MHz
Range	0.4 μsec to 0.2 sec
Gate time	Selectable 0.01 sec, 0.1 sec, 1.0 sec, 10 sec
Resolution	100 nsec, 10 nsec, 1.0 nsec, 0.1 nsec
Accuracy	±1 count ±time base accuracy ±trigger error

Unit Count	
Input Frequency (Low Range only)	5 Hz to 10 MHz
Count Capacity	99999999
Self Check	Checks and displays the internal time base oscillator frequency
Input Sensitivity	
FREQ Input: (Low Range: 5 Hz to 10 MHz; High Range: 5 MHz to 100 MHz)	
Attenuator X1.0	20 mV RMS
X0.1	200 mV RMS
FREQ RATIO & TIME INTERVAL Input:	(Low Range: 5 Hz to 2.5 MHz; High Range: 2 MHz to 25 MHz) 20mV RMS
Input Impedances	Constant 1 meg ohm ±50 kilo ohm shunted by less than 30 pF over frequency range and attenuator position
Max. Input Peak Voltage (DC + AC Peak)	
5 Hz to 1 KHz	212 Volts
At 100 MHz	7 Volts
Power Consumption	15 VA max. at 117 VAC

Section Seven
SCHEMATIC CIRCUIT DIAGRAMS



Power Supply and Input Channels Schematic



Counter and Control Logic Schematic

Section Eight
SERVICE

8.1 FUSE REPLACEMENT

1. Disconnect AC power cord.
2. Open instrument case by loosening the four screws.
3. Replace fuse (located on printed circuit board, next to the transformer) with only the proper size fuse as specified below:

   For 117V version—0.3A, 250V fuse
   For 234V version—0.2A, 250V fuse.

4. Re-secure instrument case.

Section Eight

SERVICE INFORMATION

Factory Service

Read the warranty located at the front of this manual before requesting warranty or non-warranty repairs.

Shipping Instructions

For in- and out-of-warranty repairs in the United States, we recommend shipping your Instrument to the factory for repair. Our factory service center features 24-hour turnaround time under normal circumstances, with a maximum of 48 hours guaranteed. Combined with low flat rate charges and fast turnaround time, the factory service center provides your best overall service alternative. An Instrument returned for calibration or repair, should be shipped with the following: your company name (if applicable), your name, address, telephone number, proof of purchase (for warranty repairs), and any test leads used with the meter.

In addition, make sure to **include a written description of the problem encountered or service required. For minimum turn-around time on out-of-warranty repairs please phone in advance for service-charge rates. Ship the Instrument in original packaging or a sturdy box to the following address and marked *Attention: Instrument Repair/Service***:

For U.S.A.:
Wavetek Corp.
9045 Balboa Ave.
San Diego, CA 92123
Tel: (619) 279-2200, ext. 670
Fax: (619) 495-3296

For U.K.:
Wavetek Ltd
Hurricane Way
Norwich, NR6 6JB, U.K.
Tel: 011-44-603-404824
Fax: 011-44-603-483670

Other:
Contact either Factory Service Center for the name of a local authorized service center.

The Instrument will be returned with the shipping charge paid by Wavetek Corp.
For questions in North America, contact the Instrument Repair & Service Department at (619) 279-2200, ext. 670.

U.S. Distribution & Service Center
Wavetek Corporation
9045 Balboa Ave.
San Diego, CA 92123 USA

European Distribution & Service Center
Wavetek Ltd.
52 Hurricane Way
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